



Janice K. Brewer  
Governor

Kathy Peckardt  
Interim Director

**ARIZONA DEPARTMENT OF ADMINISTRATION**

OFFICE OF THE DIRECTOR

100 NORTH FIFTEENTH AVENUE • SUITE 401

PHOENIX, ARIZONA 85007

(602) 542-1500

December 10, 2014

The Honorable John Huppenthal  
Superintendent of Public Instruction  
Arizona Department of Education  
1535 West Jefferson Street  
Phoenix, AZ 85007

Dear John:

In response to the *Amended* Project Investment Justification (PIJ) for the “**AELAS Standardized Student Data Store**” project, my staff has reviewed your updated proposal to use a cloud-hosted vendor for services and meet legislative requirements for correction to state aid for schools.

The original PIJ implied that Arizona Education and Learning Accountability System (AELAS) funding was available from the FY2014 Automation Projects Fund (APF) in the amount of \$1,550.0 thousand for the total five-year life cycle cost of the project, with \$630.0 thousand allocated for Assessment costs to be incurred during the Pre-PIJ discovery phase.

The prior amended PIJ implied funding was available from the FY2015 APF in the amount of \$2,200.0 thousand, for a total five-year life cycle cost for the project of \$3,750.0 thousand.

This amended PIJ implies no change in funding.

This is the Arizona Strategic Enterprise Technology Office's **Approval with Conditions** of the *Amended* technology project as follows:

1. Given the required independent third-party reviews of project progress, ADE will make the results of the reviews available to ITAC as of the end of each calendar quarter, if requested.
2. Prior to any acquisition other than Professional & Outside Services identified in the approved PIJ, ADE must provide detailed information, including pricing, quantity, and description, regarding the proposed technology or services and obtain approval from ADOA-ASET, and ITAC if required, before proceeding with the planned expenditure.
3. If ADE requires any funding on this project beyond the FY2015 APF allocation, ADE must submit a new PIJ to reflect the additional scope of work, for ADOA-ASET and ITAC review and approval.
4. The Arizona Department of Education must ensure that appropriate levels of security controls are in place prior to the migration of any service offerings that may involve sensitive, confidential or Personally Identifiable Information (PII) data to the cloud.

You may proceed to secure additional approvals as required from the Joint Legislative Budget Committee, the Office of Strategic Planning and Budgeting, and the State Procurement Office.

Best Wishes,



Aaron V. Sandeen  
State CIO and Deputy Director  
Arizona Strategic Enterprise Technology (ASET) Office

ec

cc: Elliott Hibbs, ADE  
Mark Masterson, ADE  
Komal Dubey, ADE  
Lisa Blyler, ADE  
Randall Lohn, ADE  
Patty Clark, ADE  
Andrew Smith, JLBC  
John Arnold, OSPB  
Barbara Corella, SPO  
Phil Manfredi, ADOA-ASET  
Veronica Garcia, ADOA-ASET  
Eddy Cheng, ADOA-ASET

ASET# ED14004\_A3

Analyst: Eddy Cheng

**PIJ Summary - ASET**

Project Number: ED14004\_A3

<i>Agency Name &amp; Address</i>	<i>Contact Information</i>
Arizona Department of Education 1535 West Jefferson Street Phoenix, AZ 85007	Lisa Blyler 602.364.3144 Lisa.Blyler@azed.gov
<i>Project and Investment Justification Name</i>	<i>Date Submitted</i>
AELAS Standardized Student Data Store	January 17, 2014 - Original PIJ May 20, 2014 – Amended PIJ August 1, 2014 – Amended PIJ <b>November 24, 2014 – Amended PIJ</b>

**Project Overview**

**Problem Description**

Local Education Agencies (LEAs) within the State are required to submit student-related data to various business units within the Arizona Department of Education (ADE), in order to meet reporting mandates. Program areas across the Agency currently operate in silos, resulting in multiple and redundant data submissions. Data is also submitted in different formats from different program areas, which can cause incorrect reporting and incorrect funding. A large task force within ADE is dedicated to supporting LEA data integrity issues, while specialized team members are also required at the LEAs to support these data submissions and track the multitude of format and requirement changes. In addition, the primary system which ADE uses to process student level data submitted by LEAs is a fragile application, with an outdated architecture and technology that is difficult and costly to maintain. Many program areas within ADE have established their own data stores and processes, due to the perceived lack of integrity within the Student Accountability Information System (SAIS).

**Solution**

ADE has determined that a standardized data model for collecting student-related data must be established. Adopting the Ed-Fi standard and maintaining compliance will ensure reporting continuity, data integrity and compliance with requirements across district, state and federal levels. The proposed model will be compliant with Ed-Fi, a universal education data standard and tool suite established by the Ed-Fi Alliance. Along with the Common Education Data Standards (CEDS), Ed-Fi has been adopted by the Arizona Data Governance Commission as the state standard moving forward for any new development or procurement. The Ed-Fi solution includes a unifying data model, data exchange framework, application framework, and sample dashboard source code. The solution is open, XML (Extensible Markup Language) based, and CEDS-aligned, allowing vital academic information on K-12 students to be integrated and consolidated from a broad range of data systems, while leaving the management and governance of that student data within the owning districts and states.

*Out of the 16 data domains needed to comply with the Federal Ed-Fi Model, ADE will finish creating three (3) data domains, and a portion of a fourth data domain, in FY2014. With this Change Request, ADE is proposing to utilize FY2015 APF funding to finish the fourth domain, and create five (5) additional domains. This will allow ADE to fully operationalize the Student Data Store for state reporting. While not yet defined or*

*included in the scope of work for this project, ADE will continue to work with the LEAs and vendor community to determine an approach, if possible, for integrating the remaining 7 data domains of the Federal Ed-Fi Model.*

### **Major Deliverables and Outcomes**

During the Assessment phase, ADE contracted resources gathered information from both internal and external Subject Matter Experts, to deliver the requirements, technology approach, and schedule, effort and cost associated with implementing the standardized data store. Deliverables for the development phase of the project include:

- Stand up and configure and test servers
- Ed-Fi Data interchange: This deliverable will receive student enrollment, attendance, student course connection and other student information from the LEA SIS. ADEConnect integration will enable the SIS to authenticate and securely transmit data to the web service.
- Student Information Rule Service: Several different rule engines will be put into place to extract student information, store business rules on attendance, enrollment and course connection data.
- Agency ODS ETL (Operational Data Store - Extract Transform and Load): The ETL process to load Student information data is required for Post-Secondary and SLDS from current SAIS Student-Details database into the Agency ODS.

*Deliverables for Release 1, to be completed by June 30, 2014, include the following Data Domains:*

- *Enrollment*
- *Student Attendance*
- *Student Identification and Demographics*
- *Teaching and Learning (Part 1)*

*Deliverables for Release 2, to be completed by June 30, 2015, include the following Data Domains:*

- *Alternative/Supplemental Services (4 sub-domains)*
- *Assessment*
- *Discipline*
- *Staff*
- *Student Academic Record*
- *Teaching and Learning (Part 2)*

*In order to fully operationalize the Student Transaction ODS, ADE will also complete the following as part of the scope of Release 2:*

- *Review/update one-time load from the old ADE Enterprise System to new EdOrg architecture.*

- *Review/update one-time loads and implement recurring loads for 1 non Ed-Fi domain and 5 Ed-Fi domains:*
  - Non Ed-Fi Domain*
  - LEA School Calendar*
  - Ed-Fi Domains*
  - Student Identification and Demographics*
  - Student Enrollment*
  - Student Attendance*
  - Teaching and Learning (partial);*
  - Staff (partial)*
- *Configure and implement additional Ed-Fi domains:*
  - Staff (Partial)*
  - Teaching and Learning (for elements not identified in Release 1)*
  - Student Discipline*
  - Student Academic Record*
  - Assessments*
  - Alternative/Supplemental Services (4 sub-domains)*
- *Configure and implement additional Assessment Sources needed to provide test scores needed for the Alternative/Supplemental Services domains.*

*Streamline the student related data collection by utilizing a standard data model. Adopting the Ed-Fi standard and maintaining compliance will ensure reporting continuity, data integrity and compliance with requirements across district, state and federal levels.*

*The Ed-Fi solution:*

- *Aggregates information from a broad range of disparate data sources*
- *Provides districts and states the capability to provide consistent and comparable performance data across schools, districts and programs*
- *Extends existing data systems' capabilities*
- *Integrates easily into existing IT environments*
- *Facilitates cost-effective implementation*
- *Aligns with existing local systems as well as federal standards such as Common Education Data Standards (CEDS)*
- *Reduces both time and money spent on state- and federal-level reporting*
- *Is designed to accommodate future education data innovations and evolving accountability requirements*

*Release 1 proposed in this PIJ is a subset of the Ed-Fi solution.*

*Release 1 is intended to identify the core attributes of the student data store. A business logic layer that will sit atop the data store will enforce the business rules, and those rules will be tried and tested during its deployed use by adopting LEAs. Data that has been processed by the Business logic layer will then be transferred to the Agency Operational Data Store and tested by other data domains (from other projects/AELAS PIJ's) that utilize or have dependencies on it.*

*The following Student transactions are in Scope for this Release 1: FY 2014*  
*001 Student Enrollment*

002 Student Re Admissions  
 003 Student Withdrawals  
 004 Student Absence  
 005 Student Personal Information  
 006 Student Membership Change  
 007 Student District of Residence Transfer  
 008 Students FTE  
 009 Student Grade Transfer  
 010 Student payer Factors  
 011 Support Program Participation Transactions  
 013 Language Program Participation  
 014 SPED Service Participation  
 015 Support Program Participation Transactions  
 016 Student Year End Statuses  
 017 Student Attendances  
 018 Student Summer Withdrawals  
 020 Community College Classes  
 Student Teacher Course Connections

*The following Student transactions are in Scope for this Release 2: FY 2015*

*Review and improve based on Pilot Feedback. (Infrastructure and Process)*  
*Student Teacher Course Connections (For elements not identified in R 1)*  
 11 All Needs  
 13 Languages Program Participation  
 14 SPED;  
 15 Support programs  
 20 Community College (For elements not identified in Release 1)  
 22 Student Test Label  
 23 Early Childhood Program Participation  
 24 Early Childhood Preschool Assessment  
 25 Dropout Recovery  
 26 Grand Canyon Diplomas

*ODS Design and Development (Phase 2)*

1. *Review/Update one-time load from Enterprise to EdOrg;*
2. *Review/update the one time loads and Implement recurring loads for 6 domains:*  
*Calendar;*  
*Student Identification and Demographics*  
*Student enrollment; Student Attendance*  
*Teaching and Learning (partial);*  
*Staff (partial)*
3. *Configure and Implement additional EDFI domains:*  
*Staff (Partial)*  
*Teaching and Learning (For elements not identified in Release 1)*  
*Student Discipline*

## *Student Academic Record*

### *Assessments*

#### *Alternative/Supplemental Services (4 sub-domains)*

#### *4. Configure and Implement additional Assessment Sources:*

*PCG*

*ATI*

*ACT*

*SAT*

*Explorer*

*The following Services will be delivered as part of the scope of the Release:*

- *Ed-Fi Data Interchange*
  - *Ed-Fi REST API – web services to receive student enrollment, attendance, student course connection and other student information from the LEA SIS.*
  - *LEA-Data – database to store the data received from the LEA SIS.*
  - *ADE-Connect Integration – enables the SIS to authenticate with ADE-Connect and securely*

*Transmit the data to the web services.*

- *Course, Organization, Student and Staff ETL – package to load course, organization, student and staff data to the LEA-Data database so the student data can be validated for data integrity when it is submitted through the web services.*
- *Student Information Rules Service*
  - *Data Extraction Engine – extracts the student information data that has been modified since the last time the business rules processing was executed.*
  - *Business Rules Engine – stores the business rules that an enrollment, attendance or student course connection data has to comply with based on the statutes or ADE business rules. The business rules engine will allow the rules to be maintained outside of the rules processing source code, so that it can be changed using a business rules editor if a statute change impacts the business rule.*
  - *Business Rules Processor – process the student data extracted and calls the business rules engine to apply the appropriate business rule for the type of student information being processed. Captures any business rule exceptions from the rules engine and stores that in the Exceptions database. Pushes the valid student data to the Agency-ODS.*
  - *Exceptions database – database to hold any business rule exceptions data so it can be retrieved by the SIS using a web service.*
  - *Exceptions Web service – web service that exposes the business rule exceptions, so the SIS can consume it and have the LEA data steward correct the exceptions.*
- *Data Validation Service*
  - *Data from the new Ed-Fi Student Data Interchange will be compared and verified against SAIS Transaction and Integrity.*
- *Agency-ODS ETL*
  - *ETL process to load Student information data that is required for Post-Secondary and SLDS from current SAIS Student-Details database into the Agency ODS.*

*ADE is amending the project scope to meet new legislative requirements (15-915) and is looking to use cloud-based services from Microsoft to handle anticipated large volume of user website demands.*

Streamline the student related data collection by utilizing a standard data model. Adopting the Ed-Fi standard and maintaining compliance will ensure reporting continuity, data integrity and compliance with requirements across district, state and federal levels.

The Ed-Fi solution:

- Aggregates information from a broad range of disparate data sources
- Provides districts and states the capability to provide consistent and comparable performance data across schools, districts and programs
- Extends existing data systems' capabilities
- Integrates easily into existing IT environments
- Facilitates cost-effective implementation
- Aligns with existing local systems as well as federal standards such as Common Education Data Standards (CEDS)
- Reduces both time and money spent on state- and federal-level reporting
- Is designed to accommodate future education data innovations and evolving accountability requirements

Release 1 proposed in this PIJ is a subset of the Ed-Fi solution.

Release 1 is intended to identify the core attributes of the student data store. A business logic layer that will sit atop the data store will enforce the business rules, and those rules will be tried and tested during its deployed use by adopting LEAs. Data that has been processed by the Business logic layer will then be transferred to the Agency Operational Data Store and tested by other data domains (from other projects/AELAS PIJ's) that utilize or have dependencies on it.

The following Student transactions are in Scope for this Release 1: FY 2014

001 Student Enrollment

002 Student Re Admissions

003 Student Withdrawals

004 Student Absence

005 Student Personal Information  
006 Student Membership Change  
007 Student District of Residence Transfer  
008 Students FTE  
009 Student Grade Transfer  
010 Student payer Factors  
011 Support Program Participation Transactions  
013 Language Program Participation  
014 SPED Service Participation  
015 Support Program Participation Transactions  
016 Student Year End Statuses  
017 Student Attendances  
018 Student Summer Withdrawals  
020 Community College Classes  
Student Teacher Course Connections

The following Student transactions are in Scope for this Release 2: FY 2015

Review and improve based on Pilot Feedback. (Infrastructure and Process)  
Student Teacher Course Connections (For elements not identified in R 1)  
11 All Needs  
13 Languages Program Participation  
14 SPED;  
15 Support programs  
20 Community College (For elements not identified in Release 1)  
22 Student Test Label  
23 Early Childhood Program Participation  
24 Early Childhood Preschool Assessment  
25 Dropout Recovery  
26 Grand Canyon Diplomas

### ***ODS Design and Development (Phase 2)***

1. Review/Update one-time load from Enterprise to EdOrg;
2. Review/update the one time loads and Implement recurring loads for 6 domains:
  - Calendar;
  - Student Identification and Demographics
  - Student enrollment; Student Attendance
  - Teaching and Learning (partial);
  - Staff (partial)
3. Configure and Implement additional EDFI domains:
  - Staff (Partial)
  - Teaching and Learning (For elements not identified in Release 1)
  - Student Discipline
  - Student Academic Record
  - Assessments
  - Alternative/Supplemental Services (4 sub-domains)
4. Configure and Implement additional Assessment Sources:
  - PCG
  - ATI
  - ACT
  - SAT
  - Explorer

The following Services will be delivered as part of the scope of the Release:

- **Ed-Fi Data Interchange**

- Ed-Fi REST API – web services to receive student enrollment, attendance, student course connection and other student information from the LEA SIS.
- LEA-Data – database to store the data received from the LEA SIS.
- ADE-Connect Integration – enables the SIS to authenticate with ADE-Connect and securely  
Transmit the data to the web services.

- Course, Organization, Student and Staff ETL – package to load course, organization, student and staff data to the LEA-Data database so the student data can be validated for data integrity when it is submitted through the web services.
- **Student Information Rules Service**
  - Data Extraction Engine – extracts the student information data that has been modified since the last time the business rules processing was executed.
  - Business Rules Engine – stores the business rules that an enrollment, attendance or student course connection data has to comply with based on the statutes or ADE business rules. The business rules engine will allow the rules to be maintained outside of the rules processing source code, so that it can be changed using a business rules editor if a statute change impacts the business rule.
  - Business Rules Processor – process the student data extracted and calls the business rules engine to apply the appropriate business rule for the type of student information being processed. Captures any business rule exceptions from the rules engine and stores that in the Exceptions database. Pushes the valid student data to the Agency-ODS.
  - Exceptions database – database to hold any business rule exceptions data so it can be retrieved by the SIS using a web service.
  - Exceptions Web service – web service that exposes the business rule exceptions, so the SIS can consume it and have the LEA data steward correct the exceptions.
- **Data Validation Service**
  - Data from the new Ed-Fi Student Data Interchange will be compared and verified against SAIS Transaction and Integrity.
- **Agency-ODS ETL**
  - ETL process to load Student information data that is required for Post-Secondary and SLDS from current SAIS Student-Details database into the Agency ODS.

**To better align with business needs, the following scope changes will be part of the Release 2: FY2015:**

- **EDFI Domains:**

- *Continue to complete the 9 domains as part of Release 2, with the exception of the below additions and removal.*

<i>EDFI Domains</i>	<i>Release 2</i>	<i>Change for FY2015</i>
<i>Alternative/Supplemental Services</i>	<i>Release 2</i>	<i>Partial as required per the legacy SAIS transactions</i>
<i>Discipline</i>	<i>Release 2</i>	<i>Removed</i>
<i>School Calendar</i>	<i>Release 2</i>	<i>Added</i>
<i>Student Cohort</i>	<i>Release 2</i>	<i>Added</i>

- *ODS Design and Development (Phase 2)*
  - *The ODS design and development will incorporate the changes as outlined by the EDFI domains. The changes to the data added or removed from EDFI domains are based on further analysis of the data dependency need from the Release 2 SAIS transactions. In order to complete all the SAIS transactions and support the downstream School Finance payments, the corresponding changes are needed for the ODS design and development.*
- *915 Process*
  - *The 915 Process allows student data and budget capacity changes for prior years, pursuant to ARS § 15-915. This process impacts the overall service delivery of the EDFI interchanges and the subsequent finance payment streams. The project needs to incorporate these requirements for analysis and development to continue making progress on the planned overall legacy SAIS de-commission.*
- *Unique ID / Split Merge*
  - *The default EDFI interchange provided by DLP (vendor partner for EDFI Alliance) does not handle the volumes needed by Arizona. The default solution also does not address the need to provide correct unique id to students in the case where one student has been assigned two unique ids (Merge) or also when a single id has*

*been assigned to two students (Split). ADE is required to develop a solution that can handle the state student population volume, utilize better search criteria and add clean up data tasks to handle data entry mistakes.*

- *EDFI Submission Workaround*

- *Not all LEAs will be able to meet the mandated date of July 1, 2015. A temporary workaround solution needs to be developed to accommodate LEAs who are not able to meet the EDFI submission. This workaround solution will be in place for FY16 to allow for school payments and state reporting to occur until the LEAs can migrate their SIS to a new system.*

- *Charter Estimated Counts –*

- *As part of the overall 915 process and the initial analysis of the current submission for charter estimated counts, the project calls for additional requirements analysis and design for EDFI because of some concerns with accuracy and timeliness in the data submission. The EDFi solution can be used to increase accuracy and efficiency in the data gathering techniques that are then used in the payment calculations.*

### *Changes to the Technology FY2015:*

*Over and above the hardware in use for the project, ADE will use the Azure Cloud environment to support performance needed to handle the large volume of transactions.*

- *Web servers will be placed in the Azure Cloud environment, which will handle the data collection from the LEAs.*
- *Valid LEA data will be stored in a data store located in the Azure cloud. When the data is checked against Business Rules, clean data will be passed onto the Agency ODS located on premise.*
- *Two legged OAuth 2.0 security framework is used to integrate between LEA systems and ADE systems.*
- *The operational costs of Azure are not paid through this PIJ. The ongoing subsequent Azure costs are slated to be paid by ADE operational budget.*

### *OAuth*

- *OAuth 2.0 will be used to authenticate EDFi submission from LEAs. The OAuth is part of the EDFI Alliance API development. ADEConnect will continue to be used for authentication and authorization for LEAs to access their reports.*

### **Benefits**

Improvements in ADE's data assets will eventually lead to replacing numerous applications with an integrated platform of core capabilities such as identity management, reporting, and a single business rules engine to meet the legislative changes in an efficient manner. Improvements at the agency will enable districts and charter schools to reconsider their resource allocation to data management, cleanup, and reaction to the constant requests from ADE for more data.

- Reduce the number of data elements utilized for LEA reporting
- Reducing the number of data collection points will eliminate the silo affect within the agency thus ensuring the data integrity
- Eliminate the redundancy of many student data elements collected by the various program areas within the agency
- Student Data elements used for reporting will be standardized within the agency
- Enable student-related data sharing in such a way as to minimize replication and errors
- Provide interoperability between the numerous program areas

*The proposed changes to the project will enable ADE to fully operationalize the Student Transaction Data Store with available Ed-Fi compliant data domains.*

### **Project Management**

ADE contracted resources are expected to manage the project and create the deliverables, including requirements and documentation to be provided by the assigned Business Analysts, a test strategy and approach to be provided by a Quality Analyst, and the technology approach and design to be provided by the Technical Lead, Data Architect, Solution Architect, and Data Analyst and Developers to be assigned to the project.

### **Enterprise Architecture**

Compliant.

### **Original Summary of Proposed Costs**

<i>All Figures in Thousands (\$000)</i>						
<i>Cost Description</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>Total</i>
Development Costs	1,550.0	0.0	0.0	0.0	0.0	1,550.0
Operational Costs	0.0	0.0	0.0	0.0	0.0	0.0
Total Project Costs	1,550.0	0.0	0.0	0.0	0.0	1,550.0

### **Prior Amended Summary of Proposed Costs**

<i>All Figures in Thousands (\$000)</i>						
<i>Cost Description</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>Total</i>
Development Costs	1,550.0	2,200.0	0.0	0.0	0.0	3,750.0
Operational Costs	0.0	0.0	0.0	0.0	0.0	0.0
Total Project Costs	1,550.0	2,200.0	0.0	0.0	0.0	3,750.0

**Recommendation:** Approval with Conditions

1. Given the required independent third-party reviews of project progress, ADE will make the results of the reviews available to ITAC as of the end of each calendar quarter, if requested.
2. Prior to any acquisition other than Professional & Outside Services identified in the approved PIJ, ADE must provide detailed information, including pricing, quantity, and description, regarding the proposed technology or services and obtain approval from ADOA-ASET, and ITAC if required, before proceeding with the planned expenditure.
3. If ADE requires any funding on this project beyond the FY2015 APF allocation, ADE must submit a new PIJ to reflect the additional scope of work, for ADOA-ASET and ITAC review and approval.
4. The Arizona Department of Education must ensure that appropriate levels of security controls are in place prior to the migration of any service offerings that may involve sensitive, confidential or Personally Identifiable Information (PII) data to the cloud.